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SCHWENCER,A. Licensing Branch 2

SUBJECT: Updates response to Rev 1 to nureg-0313 re intergranular stress corrosion cracking in BWRs.Summary of selection process used to determine welds receiving induction heating improvement treatment listed.

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September 14, 1983
G02-83-833

Docket No. 50-397

Director of Nuclear Reactor Regulation
Attention: Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Schwencer:

Subject: NUCLEAR PROJECT NO. 2
UPDATE ON IMPLEMENTATION OF NUREG-0313,
REVISION 1

Reference: Letter, G02-81-268, G. D. Bouchey (SS) to
A. Schwencer (NRC), "Hardship Exemption for
Implementation of NUREG-0313, Rev. 1," dated
September 2, 1981

In a telephone conversation on July 28, 1983, Mr. R. Auluck (NRC) requested that the Supply System update our response to NUREG-0313, Rev. 1 (referenced).

The Supply System has been closely following the problem of intergranular stress corrosion cracking (IGSCC) in boiling water reactors (BWR) since the problem first surfaced in the mid 1970's. Initially, the Supply System felt that the General Electric Company's recommendations for dealing with the IGSCC problem were adequate. Those recommendations involved: 1) solution annealing of seam welded pipe, welded fittings and of some pipe-to-fitting welds; 2) elimination of reactor recirculation system (RRC) pump by pass lines; 3) specifying carbon steel for high pressure core spray and low pressure core spray systems and 4) change out of the RRC inlet nozzle safe-ends to the reactor's pressure vessel.

Based on those recommendations, the Supply System proceeded with a program which implemented those preventive measures to the extent practical at WNP-2. Those actions are outlined in the referenced letter.

Recent industry experience has revealed that the risk of IGSCC in BWR primary systems is more extensive than originally thought, and that further preventive measures may be appropriate. IE Bulletin 82-03 was issued, providing additional details regarding the causes and extent of IGSCC, and specified

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additional examination requirements to be included in the augmented Inservice Inspection (ISI) program. IE Bulletin 83-02 was subsequently issued, providing further guidance on examination methods. The purpose of the augmented ISI is to provide additional assurance that IGSCC, if initiated, will be detected before pipe failures occur.

As a result of these new developments, the Supply System has undertaken a full reevaluation of our position on IGSCC, and of the additional preventive measures that are available to us for application to WNP-2. This reevaluation has lead us to conclude that in the interest of minimizing the risk of IGSCC at WNP-2, it would be prudent to proceed with Induction Heating Stress Improvement (IHSI) of certain "nonconforming" welds in the Reactor Recirculation (RRC) and Residual Heat Removal (RHR) Systems. IHSI has become accepted by the industry, based on testing and experience, as a means to essentially eliminate the risk of IGSCC in those welds properly treated by eliminating residual tensile stress, which is caused by welding and possibly grinding, on the inside surface of the material. It is an accepted fact that IGSCC will not occur in the absence of such tensile stress. In order to assure ourselves that IGSCC would not initiate prior to treatment, we have decided to perform the IHSI prior to fuel loading.

Following is a summary of the selection process used to determine those welds which will receive the IHSI treatment.

There are 204 welds in the RRC and RHR systems which were reviewed. This includes all circumferential and branch connection welds in piping in which failure would exceed the makeup capacity of the normal reactor water makeup systems. Of those 204 welds:

- 38 welds were found to be properly treated for protection from IGSCC, and are classified as conforming.

- 115 welds are nonconforming and are scheduled for treatment by IHSI. Those welds successfully treated, will then be reclassified as conforming, resulting in a reduction of welds subject to augmented ISI. The Supply System response to NUREG 0313, Rev. 1, is still valid with this modification.

- 12 sweepolet to pipe welds (branch connections) will be left untreated at this time. There is presently no proven IHSI coil design to provide us adequate assurance that the IHSI treatment would be effective on those "saddle" welds. The implication of leaving these 12 welds untreated is not considered to be severe. BWR operating experience has demonstrated that such welds are not among those showing a high frequency of cracking. However, we will continue to monitor advances in coil technology, as well as operating experience and alternative protection such as hydrogen injection, to allow us to apply appropriate additional protection as soon as it is warranted.

- This leaves 39 remaining welds. These welds are in the 4" and 2" interties with the reactor water cleanup system and RRC drain lines.

We have determined that IHSI is not cost effective on such small lines. If the Supply System chooses further preventive measures for these lines, it would be more cost effective to replace them with a conforming material than to perform IHSI. We have further determined that there is no immediate urgency to provide additional protection on these lines, although we are continuing to study the options available to us. Meanwhile, these lines will remain non-conforming and our augmented ISI program will provide us with early detection should IGSCC occur. We have studied the replacement option to the extent needed to assure that replacement after entering into operation is feasible.

In summary, the Supply System has instituted a comprehensive program to minimize the risk of IGSCC at WNP-2 as outlined above. We are taking every reasonable step to stay abreast of developments in the industry with regard to cracking experience, replacement material developments, and preventive treatments. We will continue in our efforts to take action to apply additional preventive measures as they are proven effective in the future.

Should you have any questions, please contact Mr. P. L. Powell, Acting Manager, WNP-2 Licensing. For your information, IHSI treatments are scheduled to commence in mid-September and take about 4 weeks to complete.

Very truly yours,

Alan Hosler for

G. C. Sorensen, Acting Manager
Nuclear Safety and Regulatory Programs

GCS:TFH:mm

cc: R Auluck - NRC
WS Chin - BPA
A Toth - NRC Site